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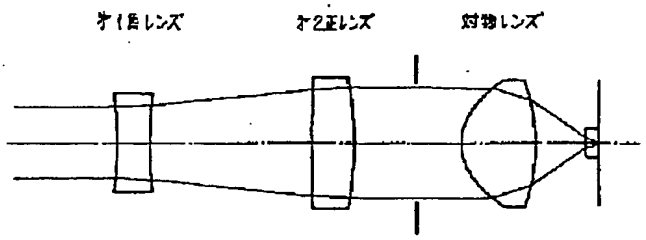
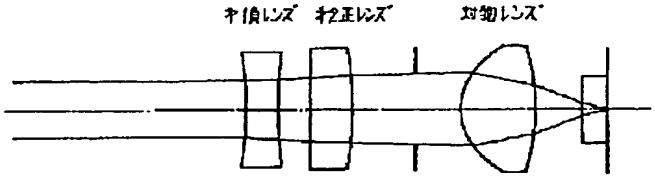
TITLE : OBJECTIVE OPTICAL SYSTEM VARIABLE IN THICKNESS OF DISK SUBSTRATE





ABSTRACT : PROBLEM TO BE SOLVED: To make it possible to deal with many disk substrate thicknesses with a simple mechanism, to eliminate the loss of light quantity and to obtain good performance by ameliorating aberrations by changing the spacing on the optical axis of a first negative lens and a second positive lens for an increase in the aberrations occurring in the change in the thickness of the disk substrate and executing focusing by slightly moving an objective lens on the optical axis for movement of an image point position.

SOLUTION: The first negative lens, the second positive lens, the objective lens and the disk substrate are arranged on the optical axis successively from a collimator side. For the change in the thickness of the disk substrate, the aberrations are ameliorated by changing the axial spacing of the first negative lens and the second positive lens. The conditions of the following equations I to IV are satisfied when the focal length of the first negative lens is defined as f_{c1}, the focal length of the second positive lens as f_{c2}, the focal length of the objective lens as fM and the radii of curvature of the first negative lens and the second positive lens are successively defined as r_1 to r_4: $-f_{c1}<f_{c2}$...(I), $r_1<0$...(II), $1.3_{r2}<|r_3|$...(III), $2fM<-f_{c1}$...(IV).